REMARKS

Amendments to the specification

Page 2, line 15 of the description has been amended to delete the words "and novel" from the description, as requisitioned by the Examiner. No new matter has been added by way of these amendments.

35 U.S.C. §112, 2nd

The Examiner has raised an objection to the term "the hydrolyzed first ionic fraction" in claim 1, line 13 as lacking antecedent support.

Claim 1 has been amended in order to replace "the hydrolyzed first ionic fraction" with "a hydrolyzed first ionic fraction". The phrase "hydrolyzed first ionic fraction" is now referred to by way of an indefinite article.

Claims 10, 15 and 18 have been amended in order to refer to the term "absence" with an indefinite article. As such, the Examiner's objection regarding indefiniteness in the claims has now been addressed.

No new matter has been added by way of the amendments to the claims.

35 U.S.C.§103

The claims 1-20 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Sirén (US 4, 734, 283 – hereinafter Sirén 1), Sirén (US 4,797,390 – hereinafter Sirén 2) and Vanderbeke et al (US 5,554,399). Applicant respectfully traverses the rejections as follows.

Sirén 1 and Sirén 2 essentially teach the production of inositol phosphate intermediates

via partial hydrolysis with phytases.

Sirén 1 teaches partial hydrolysis of IP_6 with phytases to obtain the desired IP_3 isomer, and adding IP_3 to a food composition in an amount sufficient to provide a final concentration of 5 mg of IP_3 per 100 g of food composition. The hydrolysis is carried out at a temperature of 20°-70° C and a pH of 4 to 8. The hydrolysis is stopped when the liberation of about 30%-60% of the total ester phosphorous has been achieved. A food composition is then made wherein a source of IP_3 is added to the composition such that the desired amount mentioned above is achieved. Sirén 1 does not teach the novel and inventive elements of the present invention, namely separating the slurry into a water soluble fraction and an insoluble fraction, separating the water soluble fraction into a first ionic fraction containing anionic components comprising inositol phosphates and a further other fraction which contain neutral fractions; hydrolyzing the inositol phosphates in said first ionic fraction; and separating the hydrolyzed first ionic fraction into a second fraction and a second neutral fraction which contains inositol.

Sirén 2 teaches a process where the higher inositol phosphates are broken down enzymatically to IP_3 with phytase enzyme and then added to a pharmaceutical composition in an amount sufficient to reduce the negative effect of cadmium or aluminum in the body. The enzyme is allowed to act for as long a time as is necessary for the degree of partial hydrolysis to be achieved. Sirén 2 does not teach what is missing from Sirén 1. Column 4, lines 25-38 of Sirén 2 referenced by the Examiner merely teaches adding phytase enzyme where the starting material has too low an enzymatic activity to break down higher inositol phosphates to IP_3. Sirén 2 mentions ion exchange, however this is in the context of isolating or fractionating the various inositoltriphosphate isomers, and not for separating negatively charged inositol phosphates from the other neutral components. Sirén 2 does not teach using hydrolysis to manipulate the charge characteristics of the mixture or how to isolate neutral inositol from other neutral sugars in solution such as fructose, glucose and sucrose that are present at high concentrations in a slurry of plant material.

The core of the present invention is to utilize a method for the partial hydrolysis of phytate to charge intermediates, separate these negatively charged intermediates from the neutral sugars in solution and then complete the full hydrolysis to neutral inositol that can be readily separated from charged ions and compounds using known charged based separation techniques. The elements of claim 1 and dependent claims 2-20 are not taught by Sirén 1 or Sirén 2 individually, nor by the combination of Sirén 1 and Sirén 2.

Vanderbeke teaches an enzyme composition having a synergetic phytate hydrolyzing activity comprising a phytase having phytate hydrolyzing activity at a pH of 2.5 to 5.0 and an acid phosphatase having phytate hydrolyzing activity at a pH of 2.5. The invention provides a process for hydrolyzing phytate, comprising the step of treating a raw material which contains phytate with the synergetic enzyme composition, said treatment being carried out under hydrolyzing conditions at a pH where the phytase and acid phosphatase of said enzyme composition have hydrolyzing activity.

This is completely different from the partial hydrolysis in step 1 (a) of the present invention which is preferably carried out in the absence of acid phosphatase, and to the extent that acid phosphatase is present, the pH is adjusted to be above 2.5 and more specifically between 3 and 7 in order to avoid hydrolysis to free inositol by acid phosphatase. According to the present invention the inositol phosphates contain negatively charged phosphate intermediate groups on the inositol ring after partial hydrolysis in step 1(a). As such the inositol phosphate intermediates products of partial phytate hydrolysis are charged and are in solution along with neutral sugars such as glucose, fructose and sucrose. The charged state of the inositol phosphates allows for ease of separation from neutral sugars in solution using separation techniques that are based on the physical property of electrical charge of the components of the solution. After the charged based separation is complete, the ionic fraction containing the inositol phosphates and other charged ions and molecules is subjected to full hydrolysis of the inositol phosphates in step (d) to yield inositol plus inorganic phosphate. The result is the formation of the neutral sugar inositol in a fraction containing charged compounds

and ions. The neutral inositol compound can then be separated in a pure form from the charged components of the solution using the same charged based separation techniques.

Vanderbeke does not teach the step of slurrying the plant material, partial hydrolysis of phytate with the goal of generating charged inositol phosphate intermediates, separating the soluble fraction from the insoluble fraction, charge based separation, followed by full hydrolysis of the inositol phosphates, and separating the inositol from the ionic fraction. The synergetic enzyme composition and its synergetic phytate hydrolyzing activity in Vanderbeke are not equivalent to the separate hydrolysis steps disclosed in the present invention. Vanderbeke does not teach or suggest the elements of claims 1-20. Furthermore Vanderbeke does not teach what is missing from Sirén 1 and Sirén 2.

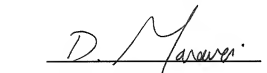
For the foregoing reasons, it is submitted that the references alone or in combination do not teach what is claimed in the present invention.

The Examiner is respectfully requested to reconsider and withdraw the rejections of claims 1-20 under 35 USC 103(a), as being unpatentable over Sirén 1, in view of Sirén 2, further in view of Vanderbeke et al.

Summary

In view of the foregoing, Applicant believes that all pending claims, namely claims 1-20 are in condition for allowance. Applicant requests early reconsideration and allowance of the present application.

Respectfully submitted,



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